

A. Cover Sheet

0116

1. **Application type:** Agricultural; Individual (Public Agency)
2. **Proposal title:** Perform on-farm mobile irrigation lab analysis and recommendations for irrigation system efficiency improvements. The project area is the jurisdictional area of the Pajaro Valley Water Management Agency (PVWMA), approximately 76,800 acres of which , approximately 30,500 acres are cultivated annually.
3. **Principal applicant:** Pajaro Valley Water Management Agency
4. **Contact- name and title:** Charles McNiesh, General Manager
5. **Mailing address:** 36 Brennan St., Watsonville, CA 95076
6. **Telephone:** 831-722-9292
7. **Facsimile:** 831-722-3139
8. **E-mail:** mcniesh@pvwma.dst.ca.us
9. **Funds requested:** \$97,500
10. **Applicant cost share funds:** \$33,405
11. **Duration:** August 2001 – December 2003
12. **State Assembly and Senate Districts and Congressional districts:**
 - i. 17th U.S. Congressional District, - Sam Farr
 - ii. 15th State Senate District – Bruce McPherson
 - iii. 27th State Assembly District – Fred Keeley
 - iv. 28th State Assembly District – Simon Salinas
13. **Location and geographic boundaries of project:** The Pajaro Valley is located approximately 100 miles south of the city of San Francisco, adjacent to Monterey Bay. The Pajaro River runs through the center of the Valley and serves as the border between Santa Cruz County to the north and Monterey County to the south. The City of Watsonville (population 37,000) is a major urban area, located in Santa Cruz County. The Pajaro Valley Water Management Agency (PVWMA) boundaries encompass approximately 76,800 acres within Monterey County, Santa Cruz County, and a portion of San Benito County.
14. **Name and signature of official representing applicant. By signing below the applicant declares the following:**
 - i. the truthfulness of all representations in the proposal;
 - ii. the individual signing the form is authorized to submit the application on behalf of the applicant; and
 - iii. the applicant will comply with the contract terms and conditions identified in Section 11 of the Proposal Solicitation Package.

Name of applicant: Charles McNiesh
General Manager

Date: Feb 14, 2001

Signature of applicant: Charles McNiesh

B. Scope of Work

B-1. Abstract

The project consists of the provision of mobile irrigation laboratory services to local growers. The mobile lab program is a solutions oriented program of irrigation system evaluations coupled with recommendations for system improvements, improved management and correction of system problems. The protocol of the mobile laboratory will utilize the field proven Cal Poly / DWR methodology. Up to 50 evaluations, at a cost of \$650 per evaluation, would be performed during each year for local growers. PVWMA staff would be responsible for management and oversight of the project. The goal of the project is to improve overall irrigation efficiencies in the Pajaro Valley by providing growers in the Pajaro Valley the means to make irrigation system improvements or irrigation system management based on the true performance of their irrigation system.

B-2. Critical Issues

The Pajaro Valley is located approximately 100 miles south of the city of San Francisco, adjacent to Monterey Bay. The Pajaro River runs through the center of the Valley and serves as the border between Santa Cruz County to the north and Monterey County to the south. The City of Watsonville (population 37,000) is a major urban area, located in Santa Cruz County. The Pajaro Valley Water Management Agency (PVWMA) boundaries encompass approximately 76,800 acres within Monterey County, Santa Cruz County, and a portion of San Benito County. Approximately 30,500 acres are used for the production of agricultural crops. The principal crops grown include strawberries, fresh vegetables, nursery/flower crops, and apples.

The PVWMA was created by state statute and approved by local residents in November 1984. The Agency is responsible for the management of water resources in the Basin. Specifically, the responsibility of the Agency is to reduce Basin overdraft and address water quality problems associated primarily with seawater intrusion, but including the issue of nitrate contamination. Currently, approximately 99% of water use in the Pajaro Valley comes from pumped groundwater. Total groundwater pumping within the PVWMA is averaging approximately 70,000 acre-feet per year, while the sustainable safe yield, under current pumping conditions is approximately 25,000 acre-feet per year. Through various pumping management strategies the sustainable safe yield can be increased to 50,000 acre-feet per year.

To make up the still existing shortfall the Agency has been undertaking long range planning efforts to identify a number of possible solutions towards solving the Pajaro Valley's water problems. The scope of solutions identified has included: wastewater recycling, water conservation, groundwater storage and banking, local surface water supplies and importation of water from the Central Valley Project. The PVWMA is constructing a groundwater storage and recovery project that is anticipated to be completed and delivering water in late spring or summer 2001. Utilizing storm runoff from local surface water, the project should supply 1,100 acre-feet annually on average. The Agency additionally has contracted for Central Valley Project water by purchasing water from the Mercy Springs Water District. As the Pajaro Valley is not currently a permitted place of use, that contract is currently assigned jointly to Westlands Water District and Santa Clara Valley Water District.

Water conservation has long been identified as an important element of the potential solution to groundwater overdraft in the basin. During February 2000, the PVWMA Board of Directors prepared the PVWMA Water Conservation Plan. The purpose of this water conservation plan was to review and evaluate existing readily available data sources and reports prepared by the PVWMA and other parties and identify the opportunity for urban and agricultural water conservation within the Pajaro Valley. The agricultural water conservation plan is separated into four major elements, with each containing various sub-elements. The Technology Element includes: 1. The installation of two additional CIMIS weather

stations; 2. Providing irrigation scheduling technology/assistance; and 3. Continuation of an ongoing mobile laboratory program.

The mobile laboratory program is currently funded through an EPA grant administered by the San Luis and Delta Mendota Water Authority, with a PVWMA cost share of 50% of the mobile lab services performed within the district. This grant was scheduled for completion in the Year 2000. Although irrigation efficiency in the Pajaro Valley is considered high when compared to some other areas of the state due to the prevalence of drip irrigation technology and sprinkler irrigation in the major crops, the water conservation plan anticipates increases in irrigation efficiencies to offset possible future increases in groundwater or surface water consumption due to changes in crop types or cropping patterns. Current irrigation efficiencies are estimated to as high as 75-85% as determined through groundwater modeling and mobile lab evaluations performed during the early 1990's. However, it is expected that not all growers may reach this efficiency level in their operations. According to scientific literature, the reported maximum irrigation efficiencies for drip and hand-move sprinkler systems is 70-90%, assuming good to excellent management. Reducing agricultural water demand, through increasing irrigation efficiencies is a major element and goal of the PVWMA's long-range water supply planning.

B-3. Project nature, scope and objectives

The lands encompassed by the PVWMA include about 30,500 acres of irrigated agricultural lands. The crops produced within the Agency are varied but include approximately 7,000 acres of strawberries, and nearly 14,000 acres of vegetable crops. The climatic and soil conditions prevalent throughout the Pajaro Valley have encouraged and allowed the production of these high value crops. Irrigation in the Pajaro Valley is achieved almost exclusively through the application of pumped groundwater and applied through the use of hand-move sprinkler and drip irrigation systems. Both sprinkler and drip irrigation systems have a high inherent potential for efficiency, however, due to site specific and system management the potential maximum efficiencies may not be achieved.

A major objective of the Agency's Water Conservation Plan is to achieve higher irrigation efficiencies within the Pajaro Valley. Continuing the operation of mobile laboratory evaluations throughout the Pajaro Valley will help to achieve a major goal of the PVWMA in increasing efficiencies at the locations where the evaluations are performed, as well as increasing grower awareness of proper system management at other ranch operations. Improvements in irrigation efficiencies are often difficult to quantify in terms of water conserved due to variation in water use of farms from year to year. PVWMA expects irrigation system efficiency increases as a result of the mobile laboratory program and implementation of any recommended physical, management, and operational improvements.

An additional benefit from the mobile lab evaluations, is the included soils and water nitrate testing, (see Section B-4). The evaluation of nitrate levels in the soils and groundwater utilized by the irrigator will indicate where the potential exists for decreasing the amount of commercial nitrogen applied to the field. Reductions in the volume of applied fertilizer reduce the risks associated with nitrate contamination of ground and surface waters in the Pajaro Valley. Higher irrigation efficiencies will also account for a more controlled and precise application of fertilizers, also reducing potential for runoff or excess deep soil percolation.

Potential in-district water savings from the continued and expanded provision of mobile lab services in the Pajaro Valley may range from 200-300 acre-feet per year, under the following circumstances: 50 mobile lab evaluations performed at an average of 100 acres affected; with a potential water savings of an average of 2% per site; and applied crop water usage on that acreage ranging from 2-3 acre feet per acre of cultivated land. The water consumption average is based on 2-3 lettuce or vegetable crops per year, or the production of one strawberry crop over the course of one year. Water consumption averages are based on long term groundwater model simulations, which have been calibrated with flowmeter data gathered by the PVWMA. Because year to year climatic variation and crop rotations can greatly

influence the amount of water consumed, it may not be possible to positively confirm water savings year to year. It will be necessary to rely on long-term reduction trends to indicate actual water savings from implementation of a mobile lab program. Groundwater model simulations support an inference of long term reduction trends in assessing water conservation effects of the mobile lab.

Water savings made through implementation of mobile lab irrigation testing will be of direct benefit to the Pajaro Valley in that overdraft is reduced and in that reliance on other water sources for long-term supplies will also be reduced. Future water sources for the Pajaro Valley include: desalination of seawater; wastewater recycling; local water development and importation of Central Valley Project supplies.

B-4. Methods and procedures

Mobile laboratory evaluations would be performed under the following conditions:

- Distribution uniformity would be determined following Cal Poly / DWR methodology;
- Irrigation efficiency would be assessed;
- Nitrate concentrations would be assessed in both the soil and water;
- The process for nitrate concentration determination and impact on nitrogen and water management practices will be demonstrated;
- A report to each participating grower will be prepared including data collected; an analysis of that data, and recommendations for improvements in the irrigation system performance;
- A post evaluation meeting between the grower and the mobile lab technician / evaluator will take place within 2 weeks of providing the evaluation report;
- Informational materials and information and instruction regarding available irrigation scheduling technology and information will be provided by the PVWMA.

B-5. Schedule

PVWMA staff will prepare an annual report for submittal to the state each January. The annual report shall summarize the number of mobile lab evaluations performed, the number of acres affected and the results of the evaluations as they apply to various irrigation system types and crop type. The PVWMA General Manager or Agency Conservation Coordinator will be available to participate in meetings and provide up to one presentation annually on the project results. The annual reports will be provided each year over the life of the project. Quarterly reports will also be provided. The Quarterly reports will consist of the number of evaluations performed during the previous quarter, the number of requested evaluations for the quarter and any outreach activities conducted during the previous quarter.

B-6. Monitoring and Assessment

Evaluation requests shall be electronically logged into a database as they are received. Once the evaluation has been completed, it shall again be entered into the database as completed, along with general evaluation results, acreage affected, crop type, and irrigation method. As discussed earlier, the amount of water conserved will be subject to variations in climate and crop rotational practices, as a result the success of the project is dependent on the reported evaluation results and water use trends. Over time, it is anticipated that irrigators with lower irrigation efficiencies will improve. The improvement will be represented in an overall reductions in groundwater pumping, as well as increasing irrigation efficiencies as reported through the mobile lab program.

The full results of the evaluations as noted earlier, will be provided to the individual growers, along with a post evaluation meeting to discuss those results. Further, the annual reports provided to the state will form the basis for reporting to the local agricultural and residential communities through the PVWMA's Annual Report. The PVWMA's Annual Report contains detailed information regarding the hydrological state of the basin, and details water use for various purposes. Within the Annual Report, individual growers results will be kept confidential.

C. Costs and Benefits

C-1. Outreach, community involvement and information transfer

The PVWMA would make periodic reports to the public and Board of Directors regarding the progress of the project. The board meets twice per month and at each meeting a short report is presented by the General Manager or his designee regarding conservation program information. A summary of the results of the project would be prepared each year and made available through the PVWMA Annual Report, as noted earlier.

There are many small growers in the Pajaro Valley. Small growers often have limited budgets and short land leases, making it difficult to achieve greater irrigation efficiencies due to their limited economies of scale. By providing these growers with the opportunity to participate in programs such as the mobile lab and receive the post-evaluation information and recommendations, they have a greater potential for increasing the efficiency of their irrigation systems and irrigation management techniques.

C-2. Training, employment, and capacity building potential

A post evaluation meeting between the irrigator / grower, the mobile lab technician and PVWMA staff will be conducted. At this meeting the results of the evaluation will be discussed and certain recommendations made. The irrigator / grower will improve their knowledge of their irrigation system performance and irrigation management techniques. PVWMA staff will also benefit from obtaining further knowledge regarding specific irrigation issues and practices within the Pajaro Valley.

C-3. Project information dissemination

The information developed by the project will be distributed through the PVWMA Annual Report each year. Additionally, bimonthly reports will be presented to the Board of Directors and the public during updates on the conservation program at the PVWMA Board meetings. Periodic presentations will be provided at local seminars and conferences relating to irrigation water and nutrient management.

D. Qualifications

D-1. Project manager resumes

Resumes for PVWMA General Manager, Charles McNiesh and Conservation Coordinator, Douglas Coty are attached.

E. Costs and Benefits

E-1. Budget Summary and Breakdown

Project costs are broken down as follows:

Table 1 – Project Cost Summary (Per Year)

Task No.	Task Description	PVWMA		Consultant		Other Direct	Total (\$)
		Hours	Cost (\$)	Hours	Cost (\$)	Costs (\$)	
Task 1	Mobile Lab Evaluations (50)	N/A	N/A	N/A	32,500	N/A	32,500
Task 2	Coordination/Administration	100	2,895	N/A	N/A	1,000	3,895
Task 3	Post Evaluation Meetings with Growers (1.5 hours per meeting)	175	5,066	N/A	N/A	200	5,266
Task 4	Presentations (2)	20	579	N/A	N/A	400	979
Task 5	Annual Reports	24	695	N/A	N/A	300	995
Total		319	9,235	N/A	32,500	1,900	43,635

PVWMA 3-Year Total: \$33,405 (\$11,135 x 3 years)

Requested Grant Funding Total: \$97,500

Project 3-Year Total: \$130,905 (\$43,635 x 3 years)

Note: Direct Costs includes advertisement, photocopying, use of audio visual aids, meeting room rentals, direct grower outreach materials, and staff travel costs and expenses

Conservation Coordinator Salary, including wages and benefits \$28.95/hour

E-2. Budget justification

The costs for the mobile lab services are based on rates for mobile lab services currently performed in the Pajaro Valley under the program administered by the San Luis and Delta Mendota Water Authority.

PVWMA labor and direct costs are associated directly with the anticipated grower meetings, administering the consultant contract, and preparing annual reports and presentations for the state and for the PVWMA Board of Directors.

E-3. Benefit Summary

The major objective of this project, as noted earlier, is to achieve higher irrigation efficiencies from on-farm irrigation systems within the Pajaro Valley. As estimated, there is a potential for water savings of up to 200-300 acre-feet per year. Avoided grower costs at an estimated total pumping cost (including water cost at \$50/AF, power costs at \$61/AF and O/M costs at \$40/AF) of \$151/AF would total an estimated \$30,200 – 45,300 per year (power and O/M costs from Technical Memoranda for the draft BMP 2000). Due to recent fluctuations in consumer power costs in California, the power cost component is likely to increase, potentially quite significantly over the long term.

The PVWMA Basin Management Plan 2000 reviews a number of different supply option packages intended to replace groundwater pumping and balance the water demands of the basin. The preferred project alternative, which includes development of local projects, delivery of Central Valley Project Water, increased water conservation and agricultural deliveries of recycled wastewater, yields an estimated delivered cost of water at \$230 per acre-foot (PVWMA, BMP 2000) at flat rates. At the anticipated project water delivery cost, the avoided grower costs increase to an estimated \$46,000 – 69,000 per year.

Avoided costs to the applicant include the costs associated with developing additional supplies. In relation to the preferred alternative in the BMP 2000, the benefits of reducing on-farm water consumption in the Pajaro Valley through higher irrigation efficiencies will directly benefit the CALFED program through potential reductions in PVWMA purchase of Central Valley Project Water.

E-4. Assessment of Costs and Benefits

The costs and benefits assessment is based on the following assumptions:

- Annual water conservation savings of 200-300 acre-feet;
- Estimated value of conserved groundwater at a current grower cost of \$150 per acre-foot, (\$50/AF PVWMA augmentations fee, \$61/AF power cost, and \$40/AF O/M costs);
- Annual project benefit of between \$30,200 and 45,300;
- Estimated value of PVWMA draft Basin Management Plan 2000 preferred alternative project delivered water cost of \$230/AF;
- Preferred alternative scenario annual project benefit of between \$46,000 - \$69,000;
- Total project cost of \$130,905;
- Project life estimated at 30, 40 and 50 years (see note below);
- The table below summarizes the potentials based on both the high and low benefits projections, as based on grower costs and future water project costs.

Project Life	Project Cost (\$)	Est. Annual Benefit (\$)	Present Worth (\$)	Net Present Value (\$)
30 Years	130,905	30,200	415,698	284,793
	130,905	45,300	623,547	492,642
	130,905	46,000	633,182	502,277
	130,905	69,000	949,773	818,868
40 Years	130,905	30,200	454,398	323,493
	130,905	45,300	681,597	550,692
	130,905	46,000	692,130	561,225
	130,905	69,000	1,038,194	907,289
50 Years	130,905	30,200	476,008	345,103
	130,905	45,300	714,012	583,107
	130,905	46,000	725,046	594,141
	130,905	69,000	1,087,568	956,663

Project life estimates of 30, 40, and 50 years were made, however, due to potential future cropping patterns and rotational practices, as well as advances in irrigation techniques and management, the life span of the project benefits is difficult to quantify.

Name of applicant: Charles McNabb
General Manager

Date: Feb 14, 2001

Signature of applicant: Charles McNabb